CLAIMS

1. A method for producing a composite object comprising at least two distinct parts having different properties and/or functions, which comprises:
   - forming at least one layer (3; 32; 53) comprising more than 70 wt.% of an expanded material selected from expanded graphites,
   - forming at least one other layer (2; 31; 52) comprising more than 70 wt.% of another expanded material selected from expanded vermiculites,
   - and then compressing the layers so formed together so as to consolidate them, each consolidated layer (3a, 2a; 32a, 31a; 56, 55) corresponding to one of the parts of the object.

2. The method as claimed in claim 1, wherein the layers (2, 3; 31, 32; 52, 53) are formed to be adjacent.

3. The method as claimed in either claim 1 or claim 2, wherein the layers formed (31, 32) are compressed together according to several directions.

4. The method as claimed in claim 3, wherein the layers formed (31, 32) are compressed together according to three orthogonal directions.

5. The method as claimed in either claim 1 or claim 2, wherein the layers formed (52, 53) are compressed according to a single direction.

6. The method as claimed in claim 5, wherein the direction of compression (c) is substantially

orthogonal with respect to an interfacial plane between said layers.

7. The method as claimed in any one of claims 1 to 6, wherein the layers formed (31, 32) are subjected to a single compression operation according to each direction (A, B, C).

8. The method as claimed in any one of claims 1 to 7, wherein the layers formed (31, 32) are subjected to a single compression operation.

9. The method as claimed in any one of claims 1 to 6, wherein the layers formed are subjected to a plurality of distinct compression operations according to at least one direction.

10. The method as claimed in claim 9, wherein there are carried out, according to that direction, a first compression operation suitable for consolidating the layers formed in order to allow them to be handled and, subsequently, a second compression operation suitable for conferring a desired density on one of said layers.

11. The method as claimed in any one of claims 1 to 10, wherein, during compression of the layers formed, there are impressed into at least one face, called an outer face, of at least one layer of graphite open recessed forms, called capture forms, which are suitable for trapping infra-red waves.

12. The method as claimed in any one of claims 1 to 10, wherein there is used as expanded graphite an expanded natural graphite.

13. The method as claimed in any one of claims 1 to 12, wherein the layer of vermiculite formed comprises less than 30 wt.% additives selected from perlite, expanded materials obtained from oxides such as SiO_2 or Al_2O_3, kandites, illites, smectites, kaolinites.

14. The method as claimed in any one of claims 1 to 13 for producing an electrochemical cell (1), wherein a layer (2) of expanded vermiculite is formed between two layers (3, 4) of expanded graphite, and then the layers so formed are compressed together.

15. The method as claimed in claim 14, wherein the layers formed are compressed together according to three orthogonal directions.

16. The method as claimed in either claim 14 or claim 15, wherein the layers formed are compressed in such a manner that the two consolidated layers (3a, 4a) of graphite have a density of from 30 to 60 kg/m^3.

17. The method as claimed in any one of claims 14 to 16, wherein, for at least one (12, 13) of the layers of graphite, microgrooves (15, 14) are formed on one face of said layer, called an inner face, that is oriented towards the layer of vermiculite, by placing destructible or removable threads between the layer of expanded graphite and the layer of expanded vermiculite during their formation, said threads being

destroyed or removed once the layers have been consolidated.

18. The method as claimed in any one of claims 14 to 17, wherein heating/cooling members are incorporated into at least one of the layers of expanded graphite during its formation.

19. The method as claimed in any one of claims 14 to 18 and as claimed in claim 11, wherein there are impressed into at least one outer face (18) of at least one layer of graphite (3a) capture forms (16, 17) having at least one front dimension of from 1 μm to 5 mm and a depth of from 1 μm to 1 mm.

20. The method as claimed in any one of claims 14 to 19, wherein each layer of graphite formed comprises less than 20 wt.% of a powder of a catalytic material, such as a catalytic metal or metal oxide.

21. The method as claimed in any one of claims 14 to 20, wherein the layer of vermiculite formed comprises lyophilized enzymes.

22. The method as claimed in any one of claims 1 to 13 for producing a mold (20), wherein a model (24) is covered with a layer (32) of expanded graphite, then a layer (31) of expanded vermiculite that covers at least part of the layer of graphite is formed, and then the layers so formed are compressed together.

23. The method as claimed in claim 22 for producing a casting mold, wherein the layers formed are compressed together in such a manner that the consolidated layer (32a) of graphite has a density greater than 100 kg/m^3.

24. The method as claimed in either claim 22 or claim 23, wherein heating/cooling members are placed in the layer of expanded graphite during its formation.

25. The method as claimed in either claim 22 or claim 23, wherein at least one channel (27, 28) suitable for receiving a heating/cooling fluid is formed directly in the mass of graphite by placing at least one destructible or removable tube (26) in the layer (32) of expanded graphite during its formation, said tube(s) being destroyed or removed once said layer has been consolidated.

26. The method as claimed in any one of claims 22 to 25 and as claimed in claim 11, wherein the layer of vermiculite is formed in such a manner as to leave at least one face of the consolidated layer of graphite, called an outer face, visible when the mold is in use, and wherein there are impressed into at least one outer face of the layer of graphite capture forms having at least one front dimension of from 1 mm to 2 cm and a depth of from 1 mm to 10 cm.

27. The method as claimed in any one of claims 1 to 13 for producing a heliothermal converter (50), wherein a layer (53) of expanded graphite is formed, in which there is provided at least one channel (54, 61)

suitable for receiving a liquid coolant, a layer (52) of vermiculite is formed, which layer covers at least part of the layer of graphite and leaves uncovered at least one face thereof, called an absorption face, and then the layers so formed are compressed together.

28. The method as claimed in claim 27, wherein at least one permanent tube (54) is placed in the layer of expanded graphite.

29. The method as claimed in claim 27, wherein at least one destructible or removable tube is placed in the layer of expanded graphite, said tube(s) being destroyed or removed once the layer of graphite has been consolidated.

30. The method as claimed in any one of claims 27 to 29 and as claimed in claim 11, wherein there are impressed into the absorption face (70) of the consolidated layer of graphite capture forms (66, 67, 68) having front dimensions of from 10 μm to 1 cm and a depth of from 1 mm to 1 cm.

31. A composite object comprising at least two distinct parts having different properties and/or functions, wherein one of the parts comprises a consolidated layer comprising more than 70 wt.% of a recompressed expanded material selected from expanded graphites, and wherein another of the parts comprises another consolidated layer comprising more than 70 wt.% of another recompressed expanded material selected from expanded vermiculites.

32. The object as claimed in claim 31, which is an electrochemical cell (1) and comprises at least one consolidated layer (2a) of recompressed expanded vermiculite inserted between two consolidated layers (3a, 4a) of recompressed expanded graphite.

33. The object as claimed in claim 32, wherein the consolidated layers of graphite have a density of from 30 to 60 kg/m^3.

34. The object as claimed in either claim 32 or claim 33, wherein at least one (13, 12) of the consolidated layers of graphite has microgrooves (14, 15) on one face, called an inner face, that is oriented towards the layer of vermiculite.

35. The object as claimed in any one of claims 32 to 34, wherein at least one of the consolidated layers of graphite incorporates heating/cooling members.

36. The object as claimed in any one of claims 32 to 35, wherein at least one of the consolidated layers of graphite has, on at least one outer face, impressed open recessed forms (16, 17), called capture forms, which are suitable for trapping infra-red waves.

37. The object as claimed in claim 36, wherein the capture forms have at least one front dimension of from 1 µm to 5 mm and a depth of from 1 µm to 1 mm.

38. The object as claimed in any one of claims 32 to 37, wherein the consolidated layer of vermiculite comprises lyophilized enzymes.

39. The object as claimed in claim 31, which is a mold (20) and comprises at least one consolidated layer (32a) of recompressed expanded graphite delimiting a cavity (29) corresponding to an object to be reproduced by molding, and a consolidated layer (31a) of recompressed expanded vermiculite covering at least part of said layer of graphite.

40. The object as claimed in claim 39, which is a casting mold and wherein the consolidated layer of graphite has a density greater than 100 kg/m^3.

41. The object as claimed in either claim 39 or claim 40, wherein the consolidated layer of graphite incorporates heating/cooling members.

42. The object as claimed in either claim 39 or claim 40, wherein the consolidated layer (32a) of graphite comprises at least one channel (27, 28) which has been formed directly in the mass of graphite and is suitable for receiving a heating/cooling fluid.

43. The object as claimed in any one of claims 39 to 42, wherein the consolidated layer of graphite has at least one face, called an outer face, that is visible when the mold is in use, and wherein at least one outer face of the consolidated layer of graphite comprises impressed open recessed forms, called

capture forms, which are suitable for trapping infra-red waves.

44. The object as claimed in claim 43, wherein the capture forms have at least one front dimension of from 1 mm to 2 cm and a depth of from 1 mm to 10 cm.

45. The object as claimed in claim 31, which is a heliothermal converter (50) and comprises at least one consolidated layer (56) of recompressed expanded graphite comprising at least one channel (54) suitable for receiving a liquid coolant, and a consolidated layer (55) of recompressed expanded vermiculite covering the layer of graphite with the exception of at least one face thereof, called an absorption face.

46. The object as claimed in claim 45, wherein the channel(s) (61) has/have been formed directly in the mass of graphite.

47. The object as claimed in claim 45, wherein the channel(s) is/are constituted by tube(s) (54) accommodated in the layer of graphite.

48. The object as claimed in any one of claims 45 to 47, wherein the consolidated layer of graphite has, on its absorption face (70), impressed open recessed forms (66, 67, 68), called capture forms, which are suitable for trapping infra-red waves.

49. The object as claimed in claim 48, wherein the capture forms have at least one front dimension of from 10 μm to 1 cm and a depth of from 1 mm to 1 cm.